INFINITE PROGRESS

How the Internet and Technology Will End
Ignorance, Disease, Poverty, Hunger, and War

BYRON REESE

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To my parents, who taught me how to think.
And to my children, who give me a reason to.

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Introduction

THE CASE FOR OPTIMISM

I'm not sure whether the optimists or the pessimists are right,
but I know this: The optimists are going to get something done.
–J. Craig Venter

There exist two sorts of optimists. There are the people who hope the future will be better. Then there are the people who reason the future will be better.

I am the second variety.

In this book, I maintain the future will be without ignorance, disease, hunger, poverty, and war, and I support those assertions with history, data, and reason. After reading my arguments, you may or may not believe the future I describe is *inevitable*, as I say it is. But I hope you will at least believe it to be possible. And you may even—reasonably, optimistically—think it to be quite likely.

If you happen to live in the United States, as I do, optimism should be coursing through your very veins. America was birthed in optimism. The American Revolution was not the story of the "have nots" overthrowing

the "haves" in a bid to increase their place in society. Just the contrary: It was the entrenched social order, those with everything to lose, who decided to fight a war with the most powerful country on the planet against overwhelming odds.

But all along, they believed they would ultimately prevail—and not just win the war, but also do something epic that would change the course of history for all time. They believed they would build a great empire of liberty that would begin a series of revolutions for liberty all around the world. And they did! While America was just a sliver of land on the Eastern Seaboard, these founders foresaw a time when it would fill up the entire continent.

As the nation grew, so did what came to be called the American Dream. It is a simple premise and yet, at the same time, an article of faith—a faith that the future would be better than the past. You may come to America and be poor, but if you work hard, your children will have a better life and a better opportunity. And their children even more. John Adams wrote of it in a letter to his wife in 1780:

> I must study Politicks and War that my sons may have liberty to study Mathematicks and Philosophy. My sons ought to study Mathematicks and Philosophy, Geography, natural History, Naval Architecture, navigation, Commerce and Agriculture, in order to give their Children a right to study Painting, Poetry, Musick, Architecture, Statuary, Tapestry and Porcelaine.

Our national character is centered on optimism. Just as ancient cultures used creation myths to explain their beginnings, we have stories of the "American Experience" that we tell again and again until they acquire mythic status. We were born and raised on these optimistic narratives: The Immigrant Who Arrives with Nothing and Makes a Fortune. The Regular Worker Who Risks It All and Strikes It Rich. The Person Who Dreams Bigger than Anyone Else and Makes It Happen. The Garage Tinkerer Who Invents the Next Big Thing.

By the midpoint of the twentieth century, America's dreamers were

preoccupied with the future—and not just any old future, but the great and glorious future that seemed inevitable. Everywhere you turned, people were speculating about, or building models of, the "House of Tomorrow," the "Car of Tomorrow," or the "Workplace of Tomorrow." At expositions and fairs around the globe, exhibits forecast a coming day when everything would be faster, cheaper, cleaner, easier, and just altogether more wonderful. Science would solve everything, prosperity would grow indefinitely, and people would thrive.

In the spirit of that time, the audacity and the unwavering confidence, John F. Kennedy told the world of plans to put a man on the moon by the end of the decade. The speech he gave in September 1962, announcing that goal, spent a good amount of time justifying the expense and explaining the urgency. But nowhere in it was there even a hint that it might not be possible. He said, in part:

> But if I were to say, my fellow citizens, that we shall send to the moon, 240,000 miles away from the control station in Houston, a giant rocket more than 300 feet tall, the length of this football field, made of new metal alloys, some of which have not yet been invented, capable of standing heat and stresses several times more than have ever been experienced, fitted together with a precision better than the finest watch, carrying all the equipment needed for propulsion, guidance, control, communications, food and survival, on an untried mission, to an unknown celestial body, and then return it safely to earth, re-entering the atmosphere at speeds of over 25,000 miles per hour, causing heat about half that of the temperature of the sun—almost as hot as it is here today—and do all this, and do it right, and do it first before this decade is out—then we must be bold.

Think of the optimism! Jet planes were only a few years old. People were still alive who knew the Wright brothers. And this man was saying we were going to the moon in a rocket ship made of metals we hadn't even invented.

And you know what? We did!

As the Jim Lovell character in the movie *Apollo 13* said, "From now on, we live in a world where man has walked on the moon. And it's not a miracle; we just decided to go."

That mindset—"Why don't we decide what kind of world we want to live in and then make it?"—permeated our collective consciousness for a long time. People overwhelmingly believed the future would be better, and they were right! They may have missed on specifics (such as each of us owning a personal jet pack and a flying car) but in general were dead-on. The present *is* better than the past. Not just a little better, but gloriously and fantastically better.

Whether you are rich or poor, live in the developed world or the developing world, life today is better and easier than it was a century ago by virtually any measure. Life expectancy. Infant mortality. Disease. Hours of leisure. Access to education. Equality. Self-rule. Opportunity. Rule of law. Wealth. Comfort. Technology. Access to information. Medical care. And on and on.

I am not saying we live in a utopia. I am not ignoring that the world is full of extreme and unacceptable want and misery. But I am making a simple statement that life is better now than it has ever been. The optimists, thus far, have been right. We have, in fact, envisioned a better world and have made it happen. Why should we expect that to change?

And yet, against all reason, starting in the 1970s our collective optimism faltered. Through some perfect storm of wars, downturns, and disasters, the once-sunny outlook turned dark. The cadence and view of life changed, and people began to think the future was not going to be better than the past. Analysts declared each successive generation might be "the first to have a lower standard of living than their parents." Scarcity was the new watchword as the focus turned to all the problems of the future, not all the possibilities. Energy depletion, pollution, landfills, and overpopulation. Ozone holes, CFCs, and global warming. Mass extinction, deforestation, dead zones in oceans, and on and on and on.

The world indeed has all sorts of challenges ahead. Some will be extremely difficult to overcome. But the present is manifestly better than the past because of all the people who expected it to be so and therefore got up early

and worked hard to make it so. "Hey, someone has to discover penicillin—it might as well be me." Someone has to sequence DNA, cure polio, create hybrid seeds to feed the world, and invent the Internet. Such bold achievements are driven by the optimism that is the natural state of humanity, and among the most powerful forces on the planet.

Is optimism rational? Blind optimism is not, to be sure. If you have an unwavering commitment to an idea that all things will be good all the time, then that is irrational. But what about a reasoned belief based on a balanced look at both history and current reality that leads you to be optimistic? Obviously, that is rational. And as I look to the past and the present, I see two phenomena that especially drive my optimism.

I see how human ingenuity and new technologies have eliminated previously insoluble problems once we stand back and let free markets do what they do best: direct the allocation of capital to find a solution. When whale oil got scarce and went up in price, the market made cheap kerosene for lighting. When the light bulb was cheaper and better, we ditched kerosene. And this will go on as long as we have the free enterprise system, where markets reward those who devise solutions for, say, pollution abatement or alternative energy creation.

I also see the pace of problem solving—and change in general—accelerating at an astonishing rate.

If you had been born in Egypt in 2570 BC, during the reign of Khufu, as the Great Pyramid of Giza was being built, you would have turned twenty in 2550 BC. From that vantage point, if you had tried to look fifty years ahead to what the world would be like in the year 2500 BC, you would have expected very little change. And you would have been right. The years passed and almost nothing changed. There is no hieroglyph for the word "progress" because the very idea of progress didn't exist.

If you had been born in 1170 in Paris, you would have turned twenty in 1190. If you had looked ahead fifty years to 1240, you wouldn't have anticipated much change. And you would have been right. The great cathedral Notre Dame de Paris, which was begun before your birth, would not be finished by your death. Very little would change in this seventy-year stretch of life.

However, if you had been born in 1992, turning twenty the year I am writing this, and tried now to imagine life in 2062, you would suppose that everything is going to change. And you would be right.

This book is about that future and what it is going to look like—how it will be a place glorious and spectacular beyond our wildest hopes. And while it may not be perfect, life will be profoundly better for everyone on the planet.

Can you imagine a world without poverty? Disease? Famine? Ignorance? War? Most people haven't even tried because we cannot reasonably imagine a way by which we can be rid of them. But I can see a path. And not just a path, but a well-lit, eight-lane highway. We are already well on our way.

For although these five woes have long plagued humanity, I am confident their days are numbered. Consider this: None of them is necessary or inevitable. There is no reason any of them have to be. They exist simply because we have not had the means to solve them in the past.

But that is changing. They are all about to vanish, courtesy of the Internet and its associated technologies. By that, I am referring to computers, connectivity, GPS, fiber, the cloud, and all things made of, or influenced by, silicon—the entire bundle of technologies relating to computation and communication.

To be perfectly clear, I am not saying the Internet and technology will solve every human ill. It won't cure gluttony, envy, vanity, sloth, pride, or jealousy. In the end, our fundamental challenge is to become better individuals, and technology offers little help on that front; it is up to each one of us to solve that for ourselves. But the five phenomena I chose to tackle in this book are among the great blights on humanity that I believe the Internet and technology will help solve.

I love thinking about the future. I love technology. I earn my living by it. I live it, breathe it, think about it, and am fascinated by all it has to offer us, all it has done for us. I am also a historian with a full understanding of how poverty, disease, ignorance, famine, and war have dominated life on this planet. But it is precisely because I am a historian that I am so optimistic. Because I am a historian, I know that big changes happen in history, and they are brought about by the most unlikely of causes.

Could you have foreseen that the advent of a technology called "air conditioning" in homes would alter the social fabric of the nation? That it would mean people would no longer know their neighbors? Who connected the dots to say that when the inside of the house is cool, people will no longer need to sit outside on their front porch to pass the hot evenings? And because of this, we would therefore lose the inevitable relationships that naturally formed?

Had you been around then, would you have seen the inscrutable lines of cause and effect that connected the new technology Gutenberg pioneered and an unknown monk named Martin Luther? That when printing became affordable, it unleashed a pent-up demand in the general public for books and pamphlets and that this would end the monopoly the church and state had on information? That this democratization of information and opinion would lead to vigorous debate and encourage a young monk to question the church? And that that same technology would allow his questions to be spread across Europe, thereby igniting the Protestant Reformation?

How difficult it would have been, at that time, to perceive that the discovery of America would inevitably end the Italian Renaissance and result in the decline of the Mediterranean world and also trigger the rise in influence of Portugal, France, Spain, and England, the west-facing marine powers, who suddenly found themselves to be at the center of the world.

Well, the Internet is bigger than air conditioning. It is bigger than movable type. Bigger than TV and cars and anything that has come before it. So isn't it just possible that it could end ignorance, disease, poverty, hunger, and war?

And wouldn't that be something?

AN OPTIMIST'S REASONING, IN FIVE EASY PREMISES

This book is unusual for two reasons. First, in the magnitude of what it claims, and second, in the degree to which it differs from what pessimists predict.

I make the predictions in this book not to be sensational or controversial. I make them because I believe I can back them up with convincing proofs and arguments. To lay the foundation for those arguments, I offer five simple premises—optimistic yet realistic assertions about the predictive nature of history, the infinite promise of technology, and the power of humanity to wield new technologies to create this world of infinite progress.

Premise One: Futurists Often Get It Wrong

Premise Two: History Can Help Us Get It Right

Premise Three: Internet Technology + Human Ingenuity = Infinite Promise

Premise Four: Accelerating Progress Is Inevitable

Premise Five: The New Renaissance Has Begun

Futurists Often Get It Wrong

For I dipped into the future, far as human eye could see, saw the vision of the world, and all the wonder that would be.
–Alfred Lord Tennyson

Let's face it: Futurists as a whole have a pretty poor track record. I think it is because they traditionally make one of two fatal errors in their approach to predicting the future.

The first error is to assert that history unfolds in a basically linear fashion, that there is a fundamental continuity between the past, present, and future. This viewpoint seems reasonable because it is largely consistent with our everyday experience of life. But while this approach is fairly reliable across relatively short spans of time, it is almost always spectacularly wrong when used for longer-range predictions. For example:

- In 1894, a writer studying population growth in large cities along with the rising need of horse-drawn conveyances such as taxis and carriages concluded that in fifty years, every street in London would be buried under nine feet of horse manure. He didn't know the car was coming.
- In the 1930s, the resulting decrease in birthrates brought about by the economic malaise of the Great Depression led social commentators to predict an end to the human race, fed by a decrease in procreation. They didn't foresee the baby boom brought about by a new post-war prosperity.

- A wild-eyed, crazed techno-optimist of the nineteenth century concluded that in fifty years there would be a telephone in every town in America. He didn't foresee the consumer demand for the telephone or its massive decline in price.

I don't cite these examples to mock these prognosticators. They were faithful straight liners. I include them to point out that history is discontinuous. It lulls you into thinking that things behave in a straight-line predictable way, and just when it looks like you have it all worked out, along comes an unforeseen, game-changing event, and WHAM!, it hits you upside the head.

The second methodology error that futurists often commit is the exact opposite of the first. This viewpoint acknowledges that history unfolds in a discontinuous manner and so assumes it must be random, arbitrary, and unpredictable. Therefore, any projection about what might happen is deemed legitimate. After all, who knows?

This approach is even more flawed than the first. Bad science fiction plots, speculating on futures which could not really happen, are the worst examples of this. These are easy to spot: They rely on huge conceptual leaps without a framework to support them. Or astounding technological breakthroughs that have no precedent in reality. Or radical shifts in human behavior or human nature, which will never happen. Books based on this "wouldn't-it-be-great-if . . ." approach to the future are works of pure faith or pure fiction, not of reason. While entertaining, they are never, ever correct.

A third way to predict the future that I believe is reliable rejects both the slavish following of the straight line and the purely speculative approach. This third way is based on the principle that it is possible to see the future by accepting discontinuity but not unpredictability.

Imagine if someone had come to you on January 1, 1991, and said, "Before the end of the year, the Soviet Union will vote itself into nonexistence and peacefully break into fifteen republics. The defining political struggle of the world for nearly half a century will end without a shot fired, and Russia itself will reject Communism as a failed system."

You would have thought this was crazy. So would have I. So would have

everyone. It seemed as if no one saw that coming because, frankly, no one could conceive of it happening.

But wait! A few people *did* see it coming. In 1970, Andrei Amalrik, a Russian writer and dissident, wrote an essay entitled "Will the Soviet Union Survive Until 1984?" in which he concluded of the USSR that "the logical result will be its death, which will be followed by anarchy." His timeframe was off by a few years, but his prediction was right.

History is full of radical breaks with the past that only seem to have come out of nowhere but were, in fact, predictable.

What if you were a pilot who had met the Wright brothers as a child and someone had come to you in 1944, when every plane you had ever seen had a propeller, and said, "In twenty-five years, we will walk on the moon." You would have said that was crazy. And yet, that happened. As impossible as it must have seemed to most people in the 1940s, a few people in that era in fact foresaw the moon landing. They made their predictions mindful of both the non-linear increases in aircraft speed already being seen and their beliefs about the potential output of the new technology of jet engines.

Discontinuity happens, but it is not unpredictable. I believe we are living at a peculiar time, with many discontinuous breaks about to happen. I further believe the aggregate effect of these breaks will forever change life on this planet and usher in a new Golden Age for humanity.

How will we see these discontinuities coming? By looking, in part, at history.

History Can Help Us Get It Right

Look back over the past, with its changing empires that rose and fell, and you can foresee the future, too.
–Marcus Aurelius, Roman Emperor, second century

I don't use history to predict the future, like some talisman that lets me pick winning lottery numbers (don't I wish). But I do use history to guide my thinking and reasoning and to inform what I imagine of the future.

I don't dispute the cliché, "Those who do not know history are doomed to repeat it." However, I often have thought that a second sentence should follow: "Also, those who *do* know history are doomed to repeat it." This is because history repeats itself—at least, as the great historian Will Durant says, "in outline form."

Why is it that history repeats itself? It repeats itself because it is the record of the choices of people. And because human nature changes either not at all or very slowly, people make the same choices over and over again.

When we look at this record of the choices of people, we see a wide range of behaviors. It shows us at our best and at our cruelest. Noble, wretched, magnanimous, heartless, petty, generous, self-sacrificing, and selfish. It is the record of innumerable conflicts and resolutions and a chronicle of uncounted victories and defeats.

Because history is a record of the choices of people, it generally holds that when we put people in similar circumstances, they will make basically the same choices. In short, it tells us everything about ourselves. It's all there. The historian Will Durant described it remarkably in his 1945 radio broadcast called "Invitation to History." It is well worth listening to, but you can get a sense of it in this transcribed passage:

> It is a mistake to think that the past is dead. Nothing that has ever happened is quite without influence at this moment. The present is merely the past rolled up and concentrated in this second of time. You, too, are your past; often your face is your autobiography; you are what you are because of what you have been; because of your heredity stretching back into forgotten generations; because of every element of environment that has affected you, every man or woman that has met you, every book that you have read, every experience that you have had; all these are accumulated in your memory, your body, your character, your soul. So with a city, a country, a race; it is its past, and cannot be understood without it. It is the present, not the past, that dies; this present moment, to which we give so much attention,

> is forever flitting from our eyes and fingers into that pedestal and matrix of our lives which we call the past. It is only the past that lives.
>
> Therefore I feel that we of this generation give too much time to news about the transient present, too little to the living past. We are choked with news, and starved of history . . .[1]

Examining history is not like gazing into some fantasy crystal ball, where what we see is prophetic in detail. But history does give us plenty of patterns of behavior and examples of cause and effect, and in those patterns and examples we usually can find ones that approximate our circumstances. I refer to history extensively in these pages because I believe historical people are *exactly* like us, only in different circumstances. Thus their actions, when placed in situations like ours, show what we would do. At the very least, history can clearly show the range of outcomes that are likely.

This will be extremely useful, because the game, as they say, has just changed completely.

Internet Technology + Human Ingenuity = Infinite Promise

The beginning of wisdom lies in calling things
by their right name.
–Chinese proverb

According to Dictionary.com, the Internet is "a vast computer network linking smaller computer networks worldwide."

It is an interesting definition, for in it there is no clue as to what this device is for—what the Internet actually *does*. Contrast it to the definition of another piece of similar, albeit older, technology—namely, the telegraph,

1. From radio broadcast "Invitation to History: The Map of Human Character" by Will Durant. Copyright © 1945, 2006 by John Little and the Estate of Will Durant.

which Dictionary.com defines (in part) as "an apparatus . . . for transmitting messages or signals to a distant place."

Do you see the difference? Bound up in the very definition of the telegraph is its purpose.

Why is the Internet so sterilely defined? Why is it only described as a mechanical device divorced from any purpose? It would be tempting to say this is an effect of the relative newness of the Internet, reflecting a time not long ago when we literally had to explain to less digital friends exactly what it was.

But this is not really a satisfying answer. The consumer Internet is roughly two decades old. If we go back and look at definitions of the telegraph when it was a similar age, we discover that Noah Webster's 1828 American Dictionary defined it as "an apparatus . . . for communicating intelligence rapidly between distant points." So, what the telegraph does is in its definition even at its early age.

I submit that the Internet is not defined in that way because it is a technology without an implicit purpose. Its purpose is neither evident nor predetermined; its purpose must be imputed to it. A telegraph exists only to transmit messages—in short, it *is what it does*. The Internet *is whatever we make it to be*.

When new technology comes out, we generally understand it in terms of what it displaces. This is not a shortcoming of our imaginations but rather a simple reality. When contemplating the future, our only point of reference is present reality. Whether things in the future stay the same as they are today or change from what they are today, both are understood in terms of the current reality.

Thus, when television first came out, people said it was "radio with pictures." The first cars were called "horseless carriages." Telephones, when they first appeared, were called "talking telegraphs." Then when telephones became untethered, they were "wireless telephones." ATMs replaced human bank tellers, so they are called "Automated Teller Machines." E-mail is electronic mail. The list is long.

Sometimes the new technology so overwhelms the old that when looking back, we explain the old technology in terms of the new. Diapers weren't called "cloth diapers" until disposable ones came out. All corn used to be "corn on the cob" until canned corn came along. And the U.S. Postal Service delivered mail until the electronic age demoted it to "snail mail."

When we only understand the new technology in terms of the old, how we use the new technology is also solely an extension of how we used the old technology. Because television was radio with pictures, the first television shows were simply men in suits standing in front of microphones reading the news. It took a decade or two for the new medium to be seen in light of itself, not just in terms of what it displaced.

Even most futurists have fallen into this trap. The 1920s to 1950s renderings of what people thought the future would look like are full of things like personal jetpacks and flying cars. Because the major technological advances occurring in those eras were related to transportation, that's what they thought of when pondering technological advance. And I think that helps explain why no one quite foresaw the rise of the Internet: *because it doesn't have an offline corollary of its own*. The future of cars? Flying cars, faster cars, more features in cars, we all get that. But what could you have seen in the 1950s from which you could deduce the Internet?

This tendency to only be able to see new technology as an extension of the old is exactly the phenomena we have seen with the Internet. Because its meaning has to be imputed, we have tended to describe it in terms of prior technologies—which, in many cases, understates its potential by many orders of magnitude.

So when we say, "The Internet is an electronic library," this is true. But it is an electronic library bigger and better than any other library that has ever existed or even been contemplated by humans. (In this allegorical understanding of the Internet, we could say Google is the card catalog—although as I write this, it dawns on me that not too many years hence, the average reader won't ever have seen a card catalog and probably won't even know the term.)

And when we say, "The Internet is an electronic store," this is true. But it is the biggest, best store ever, where you can buy anything from anywhere,

based on reviews by other buyers, at a discount, and have it gift wrapped, engraved, altered, drop-shipped, and probably delivered by tomorrow.

And if the Internet is an electronic debate, it is a more robust forum for debate than has ever before arisen on the planet, where you can find people expressing any viewpoint on any topic. And if the Internet is an electronic cocktail party, it is more like a hundred million cocktail parties going on at once, with friends connecting, professionals networking, competitors playing games, and groups coalescing around every sort of interest. What's more, the Internet can be a fact checker, post office, Rolodex, Yellow Pages, White Pages, game board, garage sale, university, movie theater, jukebox, matchmaking service, travel agent, photo album, bank, support group . . .

My point is: While the Internet does all those things, it is not accurate to say the Internet *is only* any one of them.

This is not merely a linguistic distinction. It is like my car. My car has a CD player. It has GPS navigation. It has an air conditioner. But my car is not a CD player, GPS navigation system, or air conditioner. The essence of my car is that it takes me places I want to go.

The Internet does not, like the car, have a single essence. It has many. And to the extent that our minds still perceive the Internet as an extension of offline things, we will fail to see its most revolutionary possibilities.

Until we see how the Internet changes us and allows us to do things we never even thought about doing—never imagined we would want to do—we will miss the enormous impact it can have.

We are getting there, though. We are at the point, finally, where we are seeing uses of the Internet that have no offline corollary. Think, for example, of Twitter. Nothing exists that even remotely looks like Twitter before the Internet. The mark of these technologies is that they are greeted with universal skepticism at first. That is because they seem so far out of the daily experience of most people that they cannot conceive of how or why they would use them.

I mention Twitter as an example, but there are hundreds more, most of which are presently obscure. These, to me, are the most exciting companies to look at. To paraphrase the old saying about the thin line separating genius from insanity: Online, there often is a thin line between "brilliant new idea"

and "utter lunacy." But sometimes it is hard to tell them apart when we don't have an offline frame of reference. When you hear about a new company and your response is, "Why in the world would anyone want to do that?" it will be because there is no offline corollary. Will people like it? Will they do it? Only time will tell.

And that leads us to a critical question: *Who decides what we will make the Internet do?* Who decides what the Internet will become?

All of us, through the choices we make.

The Internet has no central planning agency deciding what new, cool websites should be made. New products are driven not by some central authority but by the free market. When it comes to starting a new business, nothing that previously existed can rival the Internet in terms of both ease of entry and breadth of potential. It's the ultimate environment for an entrepreneur who, as Peter Drucker noted, "Always searches for change, responds to it, and exploits it as an opportunity."

Let's run through a scenario with a fictional entrepreneur: Linda, a single mom living in Portland, Oregon. Let's say Linda has come up with a pretty interesting idea: a social network for couples. She reasons: "When we think of social networks, we are individualistic in our approach. I have a page about me. That is the basic unit—me. I may be connected to other people, but still it is all about me. What if we thought differently? What if the basic unit was a couple, a relationship, and what if that relationship had an identity? It would have sections called 'How we met,' 'Our first quarrel,' 'How we make it work,' and so on. We post pictures, the progress of our relationship, and people can follow our "us" page."

Good idea? Who knows? I can't think of anything offline to compare it to.

But Linda decides to give it a try. She hires a contract programmer in Russia for $3,000 to code it and advertises on Craigslist for a designer who will work for some stock. She gets web hosting set up for the princely sum of $30 a month. She registers the name Hizznherz.com because the online trademark search she did (for free) turned up no matches. (Awful name, Linda!)

She wants to do business as a limited liability company, so she creates an LLC online for $200. She researches credit card processors and decides to go

with PayPal for now. She creates premium services on her site that cost just $9.95 a year that include a number of additional features and virtual goods. A friend of hers who is a florist asks if she can advertise on the site. Linda thinks about this and decides she wants to keep it ad-free for now.

Linda gets the idea to call Facebook and see if she can advertise to people who change their status to "In a relationship." Facebook doesn't return her call. She drops $300 on Google ads before realizing it might not be a great fit. She e-mails all her friends and asks them to set up relationship pages. One friend suggests she advertise on dating sites. This makes sense, so she spends her last $2,000 in savings to buy ads. Another friend tells her either member of the couple should be able to instantly remove the couple page when the relationship goes sour. This makes sense to Linda, so she gets Dmitri (the Russian developer) to make this small change.

Does it catch on? Does Linda morph it into something else? Does Linda eventually give up? The answers to those questions are what define the Internet. In the past, success relied heavily on whether an entrepreneur could move an offline experience online better than someone else. Today, success still requires good execution, but the larger question is: "Can you discover and fulfill a hitherto-unknown, latent desire in people that the Internet enables?"

That's when it gets interesting. The choices we make to test options never before contemplated will tell us all kinds of new things about ourselves.

Plus, it's all about to speed way, way up.

Accelerating Progress Is Inevitable

After growing wildly for years, the field of computing appears to be reaching its infancy.
–John Pierce

In 1965, Gordon Moore, cofounder of Intel, described a phenomenon and made a projection. He noted that the number of transistors that could be

cheaply placed on an integrated circuit had doubled every year for some time, and predicted it was likely to continue to do so.

Time has borne out the accuracy of this observation and even bestowed upon it the lofty title Moore's Law. It has endured far longer than most people—probably even Moore himself—ever imagined it could. Meanwhile, the capabilities of many more digital devices seem to be following similar trajectories. Any regular purchaser of computer equipment has noticed the growth—in hard drive size, megapixels on digital cameras, processor speed, and so on. It is expected to continue into the foreseeable future.

Inventor, author, and futurist Ray Kurzweil makes the case that the dynamics underlying Moore's Law have been operating since well before Moore mentioned it, for at least a century. Obviously in that time, the underlying technology kept shifting—computers went from electromechanical to relays to vacuum tubes to transistors and then to integrated circuits—and the abstraction, the calculations per second, kept doubling. So the physical mechanisms have been serially transformed, yet the law has never hiccupped. The abstraction keeps moving forward, and the technology races to keep up.

What is the significance of this? *It means progress at an ever-increasing pace is inevitable.* Think about it this way: All the technology accumulated from the dawn of time to today has given us a certain amount of processing power. In just eighteen months from now, we will have duplicated that again and effectively doubled our computation power. Then, in eighteen more months, it will double again. And again, and again. It is just as engineer and communication technology pioneer John Pierce said, in the quote I offered earlier: "After growing wildly for years, the field of computing appears to be reaching its infancy."

As the pace of Internet technology's advance keeps quickening, it will not only reveal (and answer) latent desires we never knew we had, but it also will increasingly mean tasks that have been technically impossible will become possible. And after they become possible, they will become very inexpensive.

Where does that all end? I am not prepared to make predictions as dramatic as Ray Kurzweil's in *The Age of Spiritual Machines*. But I do think we will see an end to any effective constraints relating to computers' ability to process data and transfer information. This is going to have profound effects.

Everyone who has been in technology for any length of time realizes the speed of the machines and the speed at which we move data around is growing faster than the tasks we give computers and the information that we move. I spend much less time downloading a file now than I did back in the days of my 28.8 modem, even though the files I am downloading are vastly larger. I spend less time waiting for Excel to do a recalculation of my formulas today than I did on my 386 in the 1990s, even though my spreadsheets are thousands of times more complex.

I doubt you need me to prove these assertions—they are probably part of your daily experience. But a single example will suffice to illustrate the whole: In the early days of computer animation, it would take days to render a single frame. Now kids are making animated movies on handheld tablets. Filmmakers such as James Cameron and George Lucas used to talk about putting off film projects to wait for the computer technology to catch up to their visions. Those films are being made now.

Eventually we reach the point where the technology does everything we need it to do. It used to be, for instance, that digital cameras competed on how many megapixels they had. But at a certain point, you don't need any more, and the technology is mature.

We often see other technologies race toward a point and then stop growing along that axis. Early cars tried to be faster and faster, to break the 60 mph barrier. But once cars improved enough, for all intents and purposes we stopped increasing their top speed. Could we make a car that can go 300 mph? Sure, but we don't need that from the technology.

If I had an even faster computer than I have today, I could come up with really interesting questions to ask it. But that situation has an end: Once I have a computer doing everything I can imagine (and some more after that), I don't need it to be any faster. We don't need our computers to be infinitely fast, just a whole lot faster than they are today. We don't need bandwidth to be instant, just nearly instant. We don't need miniaturization to go to infinitely small, just really, really small.

And what seems clear is that, sooner or later, we will get there. Our ability to process data, move information, and make things small will progress to a point where they will not be gating factors ever again. It is inevitable.

The New Renaissance Has Begun

I saw the angel in the marble and carved until I set him free.
–Michelangelo

At this point, if you follow my reasoning, we have established at least the possibility of a bright future. But I would take that further: I see the Internet and technology ushering in nothing less than a New Renaissance—and I say we already have entered it.

In European history, the Renaissance (from the French word for "rebirth") was a period of renewed interest in the Classical Greek and Roman civilizations and their art, music, writing, and philosophy. From this period came some of humanity's greatest masterpieces, including St. Peter's Basilica, Da Vinci's Last Supper, Michelangelo's Pietà, and hundreds of other instantly recognizable artistic treasures.

Though it isn't so much a time as a state of mind, historians plot the Renaissance as moving around Europe for a couple of centuries. It is thought to have had its apex in Italy—in Venice, Florence, and Rome. It is generally regarded to have ended in 1564, the year in which Michelangelo died and Shakespeare was born, ushering in the modern age.

The Renaissance was triggered, in part, by the fall of the Byzantine Empire, centered in Constantinople (the city known today as Istanbul, Turkey). When the conquest of the city seemed inevitable, a great "brain drain" of scholars, artists, teachers, theologians, and the wealthy emigrated to Western Europe, especially to Italy. As they fled the falling empire, they brought with them large numbers of Classical works not seen in the West for a thousand years and long thought by Europeans to have been lost. The arrival of these texts—as well as Byzantium's own architecture, science, and art—triggered a sensory and intellectual explosion, which became the cultural movement we now call the Renaissance.

But that movement was, by its nature, backward looking. Its reawakening of the arts derived chiefly from seeking to recapture something thought lost from a past Golden Age. Renaissance thinkers were so focused on the Classical Era that when cheap printing came along, thanks to Gutenberg, much

that was printed (aside from theological works) was either Greek or Roman classics, commentaries on Greek or Roman classics, or imitations of Greek and Roman classics. Only after the public grew weary of this did printers go off in search of completely new books, called *novels* to mark their newness.

Unquestionably, an extraordinary amount of talent was present during the Renaissance. The wealthy and influential, trying to distinguish themselves by being patrons of the arts, invested massively in all forms of art, creating a widespread appreciation of it in all the social classes. It must have been quite an exciting time to be alive. It was, however—and this is sure to earn me the wrath of many humanities professors—a time of surprisingly little originality.

I say that to contrast it to the Internet Renaissance we are in right now, in which original art is being created everywhere, and even entirely new art forms are springing up. We have put the Italian Renaissance on such a pedestal that it never occurs to us that our age could measure up to such a lofty time. But the Internet Renaissance dwarfs by a hundredfold, a thousandfold, the Renaissance of Europe. In the Italian Renaissance, only a thin veneer of society's elites participated in the creation or ownership of the frescos, music, statues, and paintings; most were only passive observers. On the Internet are far fewer passive observers. Almost everyone creates, in one form or another. In these early days of the Internet Renaissance, the number of great masters is in the tens of thousands, not the hundreds. And great masters aside, the number of people who create things online—our equivalent to painters, sculptors, composers, authors, and philosophers—is in the hundreds of millions. Almost everyone participates.

Take just one artistic expression, writing, and consider how the Internet has caused it to explode. In a masterful essay in *Wired* magazine, Clive Thompson addresses the effect that the Internet and mobile devices (with SMS, or text messaging) have had on writing. While many people think new technology is having an adverse effect on writing, he says,

> Andrea Lunsford isn't so sure. Lunsford is a professor of writing and rhetoric at Stanford University, where she has organized a mammoth project called the Stanford Study of

> Writing to scrutinize college students' prose. From 2001 to 2006, she collected 14,672 student writing samples—everything from in-class assignments, formal essays, and journal entries to emails, blog posts, and chat sessions. Her conclusions are stirring.
>
> "I think we're in the midst of a literacy revolution the likes of which we haven't seen since Greek civilization," she says. For Lunsford, technology isn't killing our ability to write. It's reviving it—and pushing our literacy in bold new directions.
>
> The first thing she found is that young people today write far more than any generation before them. That's because so much socializing takes place online, and it almost always involves text. Of all the writing that the Stanford students did, a stunning 38 percent of it took place out of the classroom—life writing, as Lunsford calls it. Those Twitter updates and lists of 25 things about yourself add up.
>
> It's almost hard to remember how big a paradigm shift this is. Before the Internet came along, most Americans never wrote anything, ever, that wasn't a school assignment. Unless they got a job that required producing text (like in law, advertising, or media), they'd leave school and virtually never construct a paragraph again.[2]

The amount of writing we are talking about is staggering. In 2007, Google researchers estimated there were one hundred trillion words on the Internet. There must be several times that by now. Google CEO Eric Schmidt famously asserted in 2010 that we create more content every two days than in the history of civilization up to 2003. As I write this, something like fifty million blogs and billions of blog posts are online. Fifty million Tweets a day. More than that in Facebook status updates every day. Millions comment on

2. From "Clive Thompson on the New Literacy" from *Wired* magazine, Issue 17.09. Copyright © 2009 by Clive Thompson. Reproduced by permission of **Featurewell.com**.

movies, millions write reviews of products. Uncounted millions more post questions in forums, and millions of answers are posted in response.

All forms of online media are exploding in a similar fashion. In 2010, people were uploading one hundred million photos on Facebook every single *day*. At least a hundred million websites are out there. Over a hundred million videos on YouTube. The Internet has made distributing music easy and has unleashed an astonishing amount of new material.

It turns out we all have a desire to be artists or philosophers or singers or photographers or commentators or reviewers. We all desire to leave our stamp on the world. We just lacked these means to do it before.

We are creating at a rate exponentially more than our most recent ancestors. This begs the question, "Is any of it any good, really?"

My answer: yes. Astonishingly great. Better than anything the world has ever seen.

Yes, there is art on YouTube. There, I said it. Now I will try to persuade you.

Let's start with a definition. By art, I am referring to creative expressions that are still relevant to future generations, something people still will consume in fifty or one hundred years. It's hard to know what later generations will deem to be art. In his day, Shakespeare was low-brow entertainment for the common class. It was not at all clear at the time that his work would transcend the ages. In fact, it's likelier that kids of that day were forbidden by proper parents from hanging out at the Globe Theater.

Charlie Chaplin wasn't initially considered art, but a century later, he still makes me laugh, and his work is hailed as groundbreaking. (I almost agree with Orson Welles' judgment that Chaplin's *City Lights* is the best movie ever made.) A. A. Milne's *Winnie the Pooh* series wasn't considered art when it came out, but nearly a century later, I reach for those books to read to my kids at night, and they enjoy them as much as children from 1926. P.G. Wodehouse's *Jeeves and Wooster* books are art, which I think will be read for the next two centuries. The Beatles made art. F. Scott Fitzgerald made art, as did Ernest Hemingway. Daniel Day-Lewis and Joaquin Phoenix and Ralph Fiennes are artists. I think *Phineas and Ferb* is likely to be art and that *Hank the Cowdog* almost certainly is. But only time will tell on that.

I don't play video games much, but I have certainly seen some that I think might survive the artistic test of time. I think the backgrounds in *Myst* from two decades ago are astonishingly good and that Rand and Robyn Miller are masters. I even bought a framed print from the sequel, Riven, which hangs over my desk. I think John Fiorella's Untamed Cinema's trailer for *Grayson* is art (and art done on a budget as well). I think Commoncraft makes things that might be art. I think the social commentary in JibJab's work is art.

We can be sure of one thing: Cartoonist Bill Watterson is a Michelangelo. *Calvin and Hobbes* is art.

So when doubters scoff—*There's art on YouTube?*—I say yes. I can't tell you which clips will be watched in a century, but I'm certain that some will be. (Actually, I could make guesses, but they might well be spectacularly wrong and a guy doesn't want that haunting him ten years from now. I can just see myself getting introduced as "the man who thought 'The Evolution of Dance' was art . . ." I don't need that in my life.)

Now, of course, much of what is on YouTube is not art. It can hardly even be called coherent. But in some ways, it's like antique furniture. We look at antique furniture today and say, "Man, they sure don't make stuff as good as they used to." But the truth is that almost all furniture back in the day was cheaply made junk and only a very few high-quality pieces survived. Those are the ones we call antiques today. The rest was reduced to firewood long ago.

Let's also remember that the Italian Renaissance was not just a flowering of the arts, but of commerce, technology, science, and trade. And in our Internet Renaissance, aren't we seeing an explosion of these same things at a spectacularly more massive scale?

Who could argue there was ever a better time to start a business any time in the world? When has starting a business been so easy? The opportunity so large? The choices so wide? Has there ever before been a time when business opportunity was more blind to color, gender, or creed? When have we seen so many fortunes made by so many so quickly?

And technology? Do I need to prove we have an explosion of technological progress dwarfing the wildest dreams of any age? We are suitably impressed that Da Vinci sketched a design for a submarine and a flying

machine. But the inventors of our age have put a billion transistors on an area the size of a postage stamp. Do those two things even compare?

And science? Recent advances in science are mind-boggling: We have mapped the genome, looked into distant galaxies, and produced the iPad, a device that seems more at home in the movie *Minority Report* than on my bedside table.

And trade? My home is full of items from every continent on Earth (well, except Antarctica). The world has become a seamless market where moving items around is so cheap and easy that we make things that cost a dollar (or a dime, or a penny) in distant lands and transport them to where they are wanted.

And philanthropy? In the Italian Renaissance, people of wealth distinguished themselves by their altruistic endeavors. Today, that is vastly more true and widespread. On top of the common-good projects supported with our tax dollars, almost all of us—certainly not just the wealthy—have causes we support. The Internet has allowed for the creation of thousands of new ways to give, both time and money. That is true from one end of the spectrum, with Bill Gates and Warren Buffet calling on the wealthy to give away half of all of their wealth, to the success of initiatives like "Tom's Shoes," where a pair of shoes is donated in the developing world for each pair you buy. And on top of all that, consider the open source movement and licensing mechanisms such as Creative Commons whereby people donate their intellectual ability and time to the greater good.

So truly, I think we have entered an Internet Renaissance that dwarfs anything the Medicis ever saw. I think it is bigger by "twenty hundred thousand times" (my favorite number used by Shakespeare.) This is not to the sixteenth-century Europeans' discredit or even to our credit. It simply has been enabled by technology combined with prosperity compounded over time. People have always had the drive and the ability to build, create, discover, and explore. We have a natural desire to make beautiful things and a bone-deep need to understand the world we live in and our place in it.

Before technology and prosperity, virtually everyone spent long hard days scraping together enough calories for themselves and their family to survive. A very, very few people, however, were freed from this sustenance lifestyle,

either by their fortuitous birth or outstanding ability. These few were given the tools to achieve their maximum potential, to live that dream.

Now a billion or more can achieve that dream, and I foresee a time not far off when everyone on the planet can. Today, there are modern-day Da Vincis living in parts of the world where just surviving is a full-time occupation, powerless to develop the gifts they could offer the wider world. But all that is about to change.

The Renaissance artists and thinkers had very few tools: pen and paper, paint and canvas, marble and chisel, and a few more. Today we have the Internet and all its associated technologies, vastly more versatile, almost infinite in possibility.

Imagine a world where everyone on the planet has access to this expanded canvas of human expression that technology has created. Where everyone can live up to his or her maximum potential. Where every Da Vinci can paint his Mona Lisa and every Dante can write his *Inferno*. Imagine a thousand new arts, none of which are even invented yet, each with a thousand new great masters.

It will be a glorious time to be alive, and I believe my children will see it happen.

THE END OF IGNORANCE

- The High Cost of Ignorance
- Your Digital Echo
- Surprise! We share.
- Data and Knowledge
- Wise Decisions
- The Jim Haynes Effect
- How the Internet and Technology Will End Ignorance

The High Cost of Ignorance

Nothing is more terrible than to see ignorance in action.
–Johann Wolfgang von Goethe

On the morning of June 28, 1914, Archduke Franz Ferdinand of Austria and his wife Sophie, Duchess of Hohenberg, were shot dead in Sarajevo by

nineteen-year-old assassin Gavrilo Princip. This launched a series of events that led to World War I, in which more than sixteen million people died.

The war helped bring about the Great Depression, which was especially bad in Germany because it had the additional burden of paying war reparations to the winning powers. Financial hardship, coupled with the "humiliation of Versailles" (the treaty that Germany signed to end the war), led to the rise in German nationalism.

That movement helped a former lieutenant named Adolf Hitler come to power. Once again, war raged in Europe and around the world and this time left sixty million people dead.

World War II ushered in the age of nuclear weapons. Its end led directly to the Cold War, which consumed inconceivable amounts of money and almost pushed the world to the brink of nuclear devastation.

What set this in motion?

Although Gavrilo Princip was part of a plot to assassinate Franz Ferdinand that day, when the plot began to unravel, he gave up and went to a café to have a sandwich. But then something totally unexpected happened. Archduke Franz Ferdinand's driver, Leopold Loyka, made a wrong turn. He turned onto Franz Josef Street, where he was not supposed to have been, and drove right in front of a surprised Princip. One can almost picture him, sandwich in hand, slack-jawed in surprise. When Loyka realized his mistake and slammed on the brakes, the archduke and his wife were sitting ducks. Princip seized the opportunity and fired into the open car at a range of five feet, killing them both.

War, poverty, misery, and nearly one hundred million people dead came from what essentially was a single wrong turn. A single bad bit of data. A tiny piece of ignorance.

Maybe World War I would have happened anyway. Maybe it was inevitable at that point that some spark would set off the powder keg of Europe. But maybe not. Maybe a bad piece of information did lead to the deaths of millions. It would not be the first time, or the last, that ignorance in the world exacted a high price.

Dictionary.com defines "ignorance" as "lack of knowledge, learning, information." In a strict sense, I could claim that the Internet will end

ignorance because, to the extent someone has access to it, they can obtain any knowledge they need. I could make the case that all knowledge is making its way online and as such, you can know anything. Thus the end of ignorance. Let's call it a day and go home.

If my reasoning stopped there, you would probably start fishing around for the receipt for this book and read up on your bookseller's return policy. While such an argument may be technically correct, I mean a good deal more by "end of ignorance" than just access to information.

The Internet is not unique in solving for this access to information. It does so in orders of magnitude better than what came before it—libraries—but only better, not differently. In 1976, if you wanted to know the middle names of all the signers of the Declaration of Independence, you could find out. It would just take several hours as opposed to a few minutes.

At issue here is what I call "The Truth Is Out There Problem." To understand this problem, consider our relationship with knowledge over the centuries.

Long ago, before Gutenberg, if you wanted to know something, you had to memorize it. That was the only way you could know something—and when the "Knower" died, the knowledge was gone, unless it had been shared with (and memorized by) someone else.

Even if Knower #1 taught someone the fact, story, etc., what if Knower #2 didn't remember it? Or changed it? Or what if Knower #2 died without teaching another? Thus knowledge was fragile; it was difficult to preserve over time because it had to be passed from person to person in an unbroken chain. It was like the Olympic torch in antiquity: All it took was one guy carrying the torch to slip in the mud and the entire chain was broken.

Not only was the extent of your knowledge whatever your own mind held, but as far as you were concerned, the sum total of all human knowledge was the aggregate of what was known by the three or four hundred people in your village. If somebody outside your village knew something, it did not matter; for you, it did not exist.

Then something wonderful happened: the invention of the modern codex, the book, in the form we know it today. And not just its invention, but its production as an affordable item, available to the middle class.

Now all of a sudden, ideas were persistent. The author could die, but the book survived. In fact, the book could survive for centuries, as could new perfect copies of the book, and thus the ideas could be distributed.

Via books, ideas became mobile—or as we would say today, went viral—spreading to other villages and other countries and to multiple places around the world simultaneously. This facilitated progress in science, the arts, theology, mathematics, and virtually every discipline in which human curiosity expressed itself.

This led to the creation of large libraries all around the world—and this was a problem. Why? Because if you come into this library and know with certainty the piece of information you need is in there yet can't find it, then for all intents and purposes, it does not exist. It's irrelevant.

I call this "The Truth Is Out There Problem": Even if you have an intellectual understanding that the truth is out there, if you cannot find it, it's as if it doesn't exist. So the simple fact that all the information in the world may soon be available to everyone via the Internet does not end ignorance, just as the existence of a library in your city doesn't end ignorance.

Search engines such as Google exist to solve this problem. They try to connect the person who wants to know something to the thing that person wants to know. Search engines have done a fabulous job tackling this problem, even given the vast, vast, amounts of information added to the Internet every day. However, even if this problem were solved perfectly, it doesn't really end ignorance. Even if we all had a robot that went with us everywhere and answered every question anyone put to us, there would still be ignorance in the world. The reason for this is what I call "The You Don't Know What to Ask Problem."

Let me illustrate this one from my own life. I enjoy traveling, especially to very different places. When I go to far-flung places, I often know little of local customs and, through ignorance, I have committed more than one faux pas. But even if I had a robot that knew everything, I couldn't really say, "Tell me every custom they have here," and be fully informed. I would need the robot to be able to proactively offer suggestions.

That's part of what I mean by the end of ignorance: having perfect information proactively delivered to you. But even that is not enough.

OF KNOWLEDGE, WISDOM, AND KINGS

To understand the distinction between wisdom and knowledge, consider the story of King Croesus, who ruled Lydia (near present-day Turkey) around 550 BC.

In the ancient world, different cities or regions would have an oracle to whom people could go and ask a question. The most famous of these was the Oracle at Delphi. King Croesus was very intrigued by all these oracles around the world. So he commissioned seven emissaries to go out to seven certain oracles around the world and on a predetermined day, let's say July 12, at a predetermined time, say 3:00 p.m. Lydian time, they were to ask their respective oracle a question: "What is King Croesus doing right now?"

The emissaries, who themselves did not know the correct answer, were to bring the replies of the oracles back to the king.

The Oracle at Delphi actually got it right. She said, "At this very moment King Croesus is making turtle and goat soup." He was, in fact, making this soup, his favorite dish. And Croesus was so amazed that he endowed the Oracle at Delphi with all kinds of gifts and planned to run all-important questions by this oracle. Wouldn't you?

Now, the problem with this is that the answers the oracles gave were somewhat vague or odd sounding. Scholars today are pretty sure that in the case of Delphi, the oracle was inadvertently breathing gases that rose from the cave in which she sat. These gases pretty much made the oracle loopy, like the famous "David after Dentist" video on YouTube. This accounted for the odd answers.

In any event, King Croesus had it in his mind to wage war against the Persians, so he asked the oracle: "Should I attack the Persians?" The oracle responded that if he crossed the river Halys and invaded Persia, a mighty empire would fall. Croesus heard what he wanted to hear and interpreted this as a good sign, but it turns out the oracle meant King Croesus's empire would fall. Croesus attacked, was defeated, and was killed.

I tell this story to make a comparison between modern times and the past. In the ancient world, man wanted guidance from the gods on what he *should* do. He wanted the wisdom of the gods. It is wisdom that King Solomon asked God for, not intelligence. In the modern era, we don't really turn to machines for their wisdom but instead turn to them for information. Think of how the computer in the Star Trek universe was a purely factual machine. Its purpose was to answer factual questions ("Computer, what is the closest planet with dilithium crystals?"), not wisdom questions ("Computer, should we go there?").

I think this is, in part, because we are only now reaching the point where machines can suggest what we should do, and for the first time, we are beginning to see how it will be technically possible to build wise machines. Wise machines are dramatically more valuable than machines that just store and retrieve information.

We will finally be able to build an oracle, and we will use that tool, that collection of life experiences, to optimize our own lives.

"If only I had known," we often lament, in the widespread belief that to know everything would mean we would never make mistakes. But knowing isn't enough. You can know everything in the world and still make bad decisions. You have to have something more: wisdom. I define wisdom as deriving a course of action from applying a value system to a situation.

Knowledge is cold facts. Knowledge is a statement like, "The interest rate on this credit card is 29.9 percent." Wisdom looks at that piece of knowledge and applies a value to it—such as, "I don't want to be in debt." And wisdom probably concludes, "I should not apply for this credit card."

So there is truth in the expression "knowledge is power," because knowledge can lay the foundation for good decisions. But it requires wisdom to put knowledge into action. It requires knowing what you should do in a given situation. So really, wisdom is power.

And I think that is what the Internet will deliver. It will make us all profoundly wise, wiser than the wisest person who has ever lived.

So let's raise the bar to this lofty level. By "the end of ignorance," I mean a world where everyone everywhere will be able to go through life making wise decisions based on near-perfect information. Or at least they will know the wise choice to make; whether they will choose it is another matter.

Now, let's see how this might come about.

Your Digital Echo

To photograph truthfully and effectively is to see beneath the surfaces and record the qualities of nature and humanity which live or are latent in all things.
–Ansel Adams

As you pass through modern life, you leave a Digital Echo, a picture of who you are and what you are doing. More and more of your everyday life leaves such an echo.

When you swipe a credit card to fill up your car with gas at the corner of sixth and Congress on January 21 at 11:38 p.m., your location and activity are digitally recorded, presumably for all time. Your credit card statement

captures an accurate, albeit extremely abbreviated, record of your comings and goings.

Pushing this to its logical extreme: What if everything you did was digitally remembered? To avoid privacy issues at this point, let's stipulate that everything is recorded only for your future reference. Just for you.

Imagine that every word you said was recorded by your personal recorder and automatically transcribed. This would be very useful: No more struggling to remember what you promised the client you would deliver by Friday; you just look up the transcript.

Then imagine GPS is layered in—very accurate GPS that tracks your every move, even in your own home. No more trying to retrace your steps to find your car keys; you can see where you left them by checking your GPS system records.

Next, imagine everything you do is remembered in detail. Not just that you went to a certain address but that the address was a movie theater and—based on where you sat and that you ordered tickets online—you saw Episode VII of *Star Wars*. Or: You are watching TV, flipping through the channels—and every channel you pause on, every channel you watch, every channel you come back to, are all perfectly logged.

Why would you want a record of this? Bear with me a little longer.

Now, think about everything being recorded. Everything you buy. Every meal you order. Every restaurant you visit. Every word you type. Every book you read. The time you have set for your lawn sprinkler to turn on. Every phone call you make. When you last went to the dentist. Everything you saw, that your eyeballs tracked to, how long you looked at it—and not just everything you ever looked at, but your physiological response. Did your eyes dilate? Your pulse increase? Your muscles tighten? Did you smile?

All your medical records. All your tax records. Every song you download and how many times you play it. Every person you meet (we all have GPS). Everything your body does. Every heartbeat. Every bite you eat, every step you take. Every breath you breathe.

Imagine it is all recorded. A complete Digital Echo of your life.

Isn't this the direction technology inevitably is heading? Whether you love it or hate it, do you doubt it will happen?

But let's not stop there.

The always-entertaining Jesse Schell, a computer-game designer and author, gives a talk about a future in which sensors are recording your every action passively. He says, in part:

> Technology keeps getting cheaper and cheaper and cheaper. And there's gonna be sensors everywhere, detecting so many things in your life. . . . So, we're moving on a road towards disposable technology. If anyone here ever bought a Furby, right, a Furby cost $20 or $30. It has more technology in it than they used to put a man on the moon. And many people have now thrown out their Furbys, because it's like "it's kinda dumb" and they throw it out. It's disposable technology. We are, before too long, gonna get to the point where every soda can, every cereal box is gonna be able to have a CPU, a screen, and a camera on board it, and a Wi-Fi connector, so that it can be connected to the Internet.
>
> And what will that world be like? Well, I think it will be like this. You'll get up in the morning to brush your teeth. And the toothbrush can sense that you're brushing your teeth and so, hey, good job for you. Ten points for brushing your teeth. And it can measure how long, and you're supposed to brush them for three minutes and you did. Good job, you brushed your teeth for three minutes. And so you get a bonus for that. And hey, you brushed your teeth every day this week, another bonus. Who cares? The toothpaste company, the toothbrush company. The more you brush, the more toothpaste you use. They have a vested financial interest.[3]

Schell regards sensors largely in terms of gameplay—but for our purposes, think of them passively logging your life. Most of the time, the logging of your life, your Digital Echo, will simply be a by-product of some action, much like your credit card statement is today. The statement is not

3. From Professor Jesse Schell's "Design Outside the Box" presentation made at the D.I.C.E. Summit, Feb 2010. Copyright © 2010 by **Jesse Schell**. Reprinted by permission of the author.